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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/733,450	12/12/2003	Shintaro Washizu	Q78911	2318

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EXAMINER	
DETSCHEL, MARISSA	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 05/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/733,450	WASHIZU ET AL.	
	Examiner	Art Unit	
	Marissa J. Detschel	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7, 9-22, 25, 27, 29-47, 50-53* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-7,9-12,14,15,17,21,22,25,27,29-38,40,41,43,46,47 and 50-53* is/are rejected.

7)☒ Claim(s) *3,13,18-20,39,42,44 and 45* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/5/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The amendments filed on April 5, 2006, have been fully acknowledged by the Examiner and are accepted. In view of these amendments, the objections to the drawings, the specification, and the claims have been withdrawn.

Response to Arguments

Applicant's arguments, see pages 17-20 in the amendment filed April 5, 2006, with respect to the rejection(s) of claim(s) 1-3, 7-9, 12-21, 34-36, 38-46, and 51-53 under 35 U.S.C. 102(b) and claim(s) 4-6, 10, 11, 22-33, 37, and 47-50 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of new prior art under Kinoshita et al. (US 2003/0179381) as presented below.

Information Disclosure Statement

In view of the Applicant's request regarding the information disclosure statement filed on March 15, 2004, sheet 4 has been signed and submitted with this Office Action. The Examiner apologizes for this sheet not being signed.

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been received in the present application.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 31 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 31 is dependent from claim 28, which has been cancelled in view of the amendment filed on April 5, 2006.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4-7, 9-12, 14, 15, 17, 21, 22, 25, 27, 29, 34-38, 40, 41, 43, 46, 47, and 50-53 are rejected under 35 U.S.C. 102(e) as being anticipated by Kinoshita et al. (US 2003/0179381 A1).

The applied reference has a common inventor and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this

application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

In regards to claim 1, Kinoshita discloses a target detection apparatus comprising:

An optical irradiation unit which irradiates light,

An optical interference unit comprising helical organic molecules each having a target capturing body bonded thereto, said helical organic molecules being aligned to form a film-like material, wherein said optical interference unit is capable of: interacting with a detection target, interfering with the light irradiated from the optical irradiation unit, radiating said light as interference light, and varying the wavelength of the interference light after interaction with the detection target, and

A wavelength change detecting unit placed in the path of the interference light which detects the wavelength variation of the interference light radiated by the optical interference unit.

In regards to claim 34, Kinoshita's apparatus includes a substrate comprising:

An optical interference unit comprising helical organic molecules each having a target capturing body bonded thereto, said helical organic molecules being aligned to form a film-like material; and

a substrate,

wherein the film-like material is provided on the substrate, and the target detection substrate is capable of interacting with a detection target, interfering with

irradiated light and radiating the light as interference light, and changing the wavelength of the interference light after interacting with the detection target.

As to the specific structure of optical interference unit of claims 1 and 34, Kinoshita discloses that the sensor of the present invention is produced by aligning a capturing body including an amphiphilic rod-shaped body and a capturing structure body being bonded to the rod-shaped body into a substrate material in film form. The capturing structure body captures a target substance. (page 1, paragraph 14) The amphiphilic rod-shaped body of Kinoshita can be a biopolymer, and suitable examples of a biopolymer are α-helix polypeptides and nucleic acids, both which are a form of helical molecules (page 2, paragraphs 32-35).

Furthermore, as to claims 1 and 34, Kinoshita discloses that the reflection of incident light as a colored interference light based on the change of refractive index or film thickness due to the capture of the target substance can be detected as a change in wavelength of the interference light. (page 1, paragraph 14) The incident light represents the light that irradiates the optical interference unit, and would be supplied by an optical radiation unit. The unit that detects the change in wavelength of the interference light represents the wavelength change detecting unit.

Regarding claim 2, the wavelength change detecting unit of the target detection apparatus of Kinoshita transmits light of a specific wavelength and can detect that light of the specific wavelength has been passed through. In order for there to be a change in

the wavelength of the interference light after passage through the optical interference unit, light of a known specific wavelength would have to be initially sent through so that the change in the wavelength can be detected from this initial known value of the specific wavelength. (page 9, paragraph 167)

Regarding claim 4, the wavelength change detecting unit of the target detection apparatus of Kinoshita measures a spectrum before wavelength change of the interference light and a spectrum after wavelength change of the interference light, and can measure their differential spectrum. The change of the wavelength of the interference light upon reflection of the incident light as colored interference light represents a differential spectrum. (page 9, paragraph 167)

In regards to claim 5, the wavelength change detecting unit of the target detecting apparatus of Kinoshita transformed the differential spectrum into a spectral intensity, and can amplify the spectral intensity. (page 1, paragraph 13) The spectral intensity is represented by the change of the color tone by the color sensor.

In regards to claim 6, the wavelength change detecting unit of the target detection apparatus of Kinoshita is a spectrophotometer. (page 9, paragraph 167)

Regarding claim 7 and 36, the optical interference unit of the target detection apparatus of Kinoshita radiates interference light as at least one selected from a reflected light and a transmitted light. The incident light is reflected in the device to create a colored interference light (page 1, paragraph 14, lines 6-12).

Regarding claim 9, the optical interference unit of the target detection apparatus of Kinoshita comprises a substrate and the film-like material is provided on the

substrate. The amphiphilic rod-shaped body and the capturing body bonded to the rod-shaped body are bonded to a substrate material in a film form (page 1, paragraph 14, lines 1-6).

In regards to claim 10 and 37, each of the helical organic molecules of the target detection apparatus of Kinoshita is rod-shaped. As disclosed above with reference to claims 1 and 34, the amphiphilic rod-shaped body of Kinoshita can be a biopolymer, and suitable examples of a biopolymer are nucleic acids, which are a form of helical molecules.

In regards to claim 11, the film-like material of the target detection apparatus of Kinoshita is formed by a coating method. Kinoshita discloses a method wherein the formation of the film-like material may be carried out in such a state that the amphiphilic rod-shaped body floats on an aqueous surface and is aligned and pushed onto a substrate using a pushing material to form the film on the substrate. (page 5, paragraph 84) This is an example of a coating method.

In regards to claim 12 and 38, the substrate of Kinoshita's target detection apparatus is formed from at least one of semiconductor, ceramics, metal, glass, and plastics. Specifically, the substrate is disclosed as a silicone substrate plate or a glass substrate plate (page 9, paragraph 163).

In regards to claims 14 and 40, the substrate comprises on a surface thereof a different refractive index film having a different refractive index from the refractive index of the film-like material. The substrate material can include a gold deposited substrate plate (page 9, paragraph 163). The different refractive index film is the gold-deposited

layer on the substrate. The refractive index of gold is different than the refractive index of a film-like material comprised of helical organic molecules and respective capturing bodies.

Regarding claims 15 and 41, the refractive index of the different refractive index film is different from a refractive index of the substrate. The different refractive index film is gold and the substrate can either be silicone or glass as disclosed above in reference to claims 12, 14, 38, and 40, and gold has a different refractive index than either silicone or glass.

In regards to claims 17 and 43, the different refractive index film is a dielectric film. The different refractive index film is made of gold and gold is a dielectric material.

Regarding claim 21 and 46, the thickness of the thin film-like material of Kinoshita's target detection apparatus is from 50nm to 1μm. The film-like material is from 10nm to 810nm (page 4, paragraph 77).

Regarding claim 22 and 47, the film-like material of Kinoshita is one of a monomolecular layer and a laminated film of a monomolecular layer. The film may either be a monomolecular film or a multiple layered monomolecular film (page 4, paragraph 79)

In regard to claim 25 and 50, the helical organic molecules of Kinoshita are α-helix polypeptides, as disclosed above with reference to claims 1 and 34.

In regards to claim 27 and 35, the target capturing body of Kinoshita is capable of interacting with the detection target by at least one selected from physical adsorption or chemical adsorption. The reflection of incident light as colored interference light is

based on the change of refractive index or film thickness due to the adsorption of the target substance (page 1, paragraph 13, lines 4-9). Examples of the capturing modes of the target substance by the capturing structured element are physical and chemical adsorption (page 5, paragraph 87, lines 1-3).

Regarding claim 29, the target capturing body of Kinoshita is at least one of a clathrate compound, antibody, nucleic acid, hormone receptor, lectin, and a physiologically active agent receptor (page 5, paragraph 88).

In regards to claim 30, the clathrate compound of claim 29 can be a monomolecular host compound such as cyclodextrin, a crown compound, or calixarene, a polymolecular host compound such as urea, thiourea, deoxycholic acid, or tri-o-thymotide, a polymer host compound such as cellulose, or an inorganic host compound such as zeolite. (pagr 5, paragraph 90 to page 6, paragraph 120)

In regards to claim 51, Kinoshita discloses a method of:

irradiating light to an optical interference unit that is capable of interacting with a detection target, and radiating the light as interference light, said optical interference unit comprising helical organic molecules each having a target capturing body bonded thereto, and said helical organic molecules being aligned to form a film-like material, and

detecting a wavelength change of the interference light upon capture of said detection target by said optical interference unit.

Regarding claim 52, the optical interference unit of Kinoshita's method can change the wavelength of the interference light after interaction with the detection target.

Regarding claim 53, the optical interference unit in the method of Kinoshita is a target detection substrate formed from a film-like material on a substrate which can interact with a detection target, wherein said optical interference unit is capable of: interacting with a detection target, interfering with irradiated light and radiating the light as interference light, and changing the wavelength of the interference light after interaction with the detection target.

In view of claims 51-53, as to the specific structure of optical interference unit of the claims, Kinoshita discloses that the sensor of the present invention is produced by aligning a capturing body including an amphiphilic rod-shaped body and a capturing structure body being bonded to the rod-shaped body into a substrate material in film form. The capturing structure body captures a target substance. (page 1, paragraph 14) The amphiphilic rod-shaped body of Kinoshita can be a biopolymer, and suitable examples of a biopolymer are α-helix polypeptides and nucleic acids, both which are a form of helical molecules (page 2, paragraphs 32-35).

Furthermore, Kinoshita discloses that the reflection of incident light as a colored interference light based on the change of refractive index or film thickness due to the capture of the target substance can be detected as a change in wavelength of the interference light. (page 1, paragraph 14) Therefore, the irradiated light is capable of

interacting with a detection target due to the capture of a target substance by the capturing body. This is detected as a wavelength change of the interference light after interaction with a detection target by the capturing body of the optical interference unit.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita (US 2003/0179381) as applied to claim 1 above, and further in view of Li et al. (USPN 6,392,756).

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The applied reference has a common inventor and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a)

might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Kinoshita does not disclose the use of a laser irradiation device or a device that can irradiate a pencil light beam as the optical radiation unit in the device. Kinoshita's device measures interference color changes which are responsive to thickness layer increases of a film of amphiphilic rod-shaped bodies formed on a substrate in a film form due to the adsorption of a target substance in a film by the capturing body in the layer (page 1, paragraph 14). Therefore, Kinoshita's device is taking thickness measurements.

Li discloses a device that determines physical parameters (i.e. thickness) of thin films (layers) deposited on a substrate. Li utilizes a tunable laser source as the optical radiation unit of the thickness measuring device (column 8, lines 43-46). It would have

been obvious to one of ordinary skill in the art at the time the invention was made to utilize the tunable laser source of Li with Kawaguchi's device in order to produce stable light in a set wavelength range for detection of the interference colors of the layer. It would have also been obvious to use optics to create a pencil light beam from the tunable laser source to create an even more stable light source, resulting in a more accurate measurement.

Allowable Subject Matter

Claims 3, 13, 16, 18-20, 31, 39, 42, 44, and 45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

As to claim 3, the prior art of record, taken alone or in combination, fails to disclose or render obvious the use of an interference filter in a wavelength change detecting unit of a target detection apparatus, in combination with the rest of the limitations of claim 3.

As to claim 13 and 39, the prior art of record, taken alone or in combination, fails to disclose or render obvious the use of a substrate comprising on a surface thereof an identical refractive index film having the same refractive index as a refractive index of the film-like material, in combination with the rest of the limitations of claims 13 and 39.

As to claims 16 and 42, the prior art of record, taken alone or in combination, fails to disclose or render obvious a substrate comprising a plurality of different refractive index films having a different refractive index from the refractive index of the film-like material formed on the substrate of a target detecting apparatus, in combination with the rest of the limitations of claims 16 and 42.

As to claims 18 and 44, the prior art of record, taken alone or in combination, fails to disclose or render obvious the use of a substrate as an interference filter, in combination with the rest of the limitations of claims 18 and 44.

As to claim 19, the prior art of record, taken alone or in combination, fails to disclose or render obvious the use of a second film formed on the surface of a film-like material on the surface of a substrate of a target detection apparatus, in combination with the rest of the limitations of claim 19.

As to claim 45, The prior art of record, taken alone or in combination, fails to disclose or render obvious the use of a dielectric film formed on the surface of a film-like material of a target detection substrate, in combination with the rest of the limitations of claim 45.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marissa J. Detschel whose telephone number is 571-272-2716. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on 571-272-2059. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Marissa J Detschel
May 1, 2006
MJD

Gregory J. Toatley, Jr.
Supervisory Patent Examiner